MEDICINE TODAY

This department of California and Western Medicine presents editorial comment by contributing members on items of medical progress, science and practice, and on topics from recent medical books or journals. An invitation is extended to every member of the California, Nevada and Utah Medical Associations to submit brief editorial discussions suitable for publication in this department. No presentation should be over five hundred words in length.

Australian Versus American Poliomyelitis.—All who have worked with poliomyelitis are agreed that monkeys convalescent from a single intracerebral inoculation with the living virus are almost absolutely immune to reinfection, regardless of the source or virulence of the test material. This general experience has led to the assumption that, while different outbreaks of this disease admittedly vary in severity and symptomatology, they are all caused by a virus of the same antigenicity or immunochemical specificity. Current attempts at specific therapy are largely based on this assumption. That this assumption is premature is indicated by recent studies by Doctors Burnet and Macnamara of Melbourne, Australia.* These investigators studied a local virus isolated by them from a fatal case with typical symptomatology and autopsy findings. They allege that intracerebral inoculation of monkeys with this virus gives the classical picture of an almost absolute immunity against the homologous strain, but no appreciable immunity against the usual strain studied by American investigators. Confirming this result, they allege that absolute immunity to the American strain is accompanied by no appreciable increase in resistance against the Australian virus.

If these alleged results are confirmed, poliomyelitis must be regarded by future clinicians not as a specific infection, but as a symptom complex. Preliminary determination of specificity must precede specific therapy.

Stanford University.

W. H. MANWARING,
Palo Alto.

Bacteriophage in Pyodermic Skin Lesions. One of the most fascinating immunologic principles recently introduced in therapeutics is the bacteriophage, or as commonly called, "'phage." Briefly stated the salient facts known about the 'phage are: The 'phage is a phenomenon, discovered by Herelle, of the lysis of bacteria by an infravisible agent of unknown nature, regenerating and multiplying at the expense of the bacteria dissolved under its action. The precise nature of it, whether it is a living virus or ferment is unknown. The most common source of the 'phage is a sewage which contains a rich mixture of 'phages. The theoretical advantage of the 'phage is that it seems entirely harmless to the patient. So far 'phages have been isolated for the colon, typhoid, dysentery and diphtheria groups and for staphylococci, but not yet for streptococci.

The technique of 'phage therapy in pyodermic skin lesions consists in hypodermic injections in and about the lesions and in local applications to the lesions. The 'phage should be tested for lysis on the cultures obtained from the skin lesions. There are three types of reactions that are observed:

1. A local reaction at the site of the injection (redness, pain, and edema);
2. A local reaction at the site of the skin lesion;
3. A systemic reaction.

'Phage therapy has naturally attracted the attention of clinicians in various specialties. The clinical reports of the use of the 'phage in isolated dermatologic cases have been published by Alderson and Crutchfield. Recently a clinical report of the use of the 'phage in a series of one hundred and eight pyogenic skin lesions was made by Cipollaro* of New York. The series consisted of sixty-seven cases of furunculosis, all of which responded well to 'phage treatment, five cases of carbunculosis which also responded well, and twenty-eight cases of sycosis vulgaris of which only seven failed to improve. The cases of acne vulgaris have failed to show any improvements, thus differing in results from those reported by Alderson in cystic acne.

In spite of the unusual attractiveness of the premises on which the rationale of the 'phage therapy is based, there are at least two factors which militate against the clinical popularity of the 'phage therapy. The first are the technical difficulties in obtaining it and a high degree of bacteriologic competence necessary for its making and testing. The second is that, for reasons unknown at present, different strains of the 'phage vary greatly in lysing power; this may account for the variability of the results at the hands of different observers.

The safe criterion and guide in the evaluation of the therapeutic efficiency of the 'phage in pyodermata would be its comparison with the older established methods of treatment. Viewed from this angle the therapeutic value of the 'phage in pyodermata must be somewhat discounted due to the fact that pyodermata, as a clinical group, do not present great therapeutic difficulties.

Superficial pyodermata react promptly to a large number of antiseptic applications including aniline dyes. Ultra-violet light offers an important supplementary agency, both local, bactericidal and in raising systemic resistance, and immunity.

The deeper infiltrating pyodermata such as furuncles, carbuncles, ecthyma, erysipelas, and pyogenic lymphadenitis respond well to dry heat poultices, carbon light, x-ray, vaccines, and cold surgery.

* Burnet, F. M., and Macnamara, J.: Immunological Differences Between Strains of Poliomyelitis Virus, Brit. J. Exper. Path., 12:56 (April), 1931.

* Cipollaro, C., and Sheplar, A.: Therapeutic Uses of Bacteriophage in the Pyodermias, Arch. Dermat. and Syph., 25:280, 1932.

In view of this the therapeutic showing of the 'phage in pyodermata at present is not definitely conclusive nor striking. At the best it is an additional therapeutic agency of great promise and potential value, but not yet certain of the positive results. Yet the 'phage offers an irresistible immunologic appeal based on an attractive hypothesis of fighting bacteria with bacteria.

This fascinating psychologic background will undoubtedly prompt many investigators and clinicians to attempt new laboratory and clinical studies until its full immunologic and therapeutic value will be established. In the meantime it is to be hoped that the further improvement and simplification in technique will bring 'phage therapy to the level of the clinical procedure within reach and competence of an average practitioner.

1930 Wilshire Boulevard.

MOSES SCHOLTZ,
Los Angeles.

Note on Hemoglobin Formation and the Iron Reserve.*—The recent work of many investigators (Hart, Elvehjem, Beard, Myers, Williamson, etc.) has demonstrated the value of "food iron" in building up hemoglobin during and after nutritional anemia. It has also been shown that other elements are important in facilitating or "catalyzing" the process whereby the iron is utilized. Of these other elements, copper is probably the most efficacious. In fact, the effectiveness of liver extract must be referred to its high copper as well as high iron content.

It has also long been known that there exists in the liver and spleen of mammals considerable iron, presumably the residue of hemoglobin breakdown. According to the classical conception, the hemoglobin in the worn-out corpuscles is split into hematin and globin. The latter passes into the blood stream and the former undergoes a decomposition which results in the storage of the iron moiety while the balance of the molecule is discharged from the liver in the form of bile pigments. The iron then forms a reserve capable of use in regenerating the lost hemoglobin, a reserve which may be seriously depleted should a condition of anemia occur in the animal. There are, therefore, two possible sources of iron in recovery from anemia, the fresh supply in the food, and the reserve in the liver and spleen. Since it is established beyond doubt that copper facilitates the utilization of the food iron, the question arises whether it also assists in the utilization of the reserve iron.

Experiments already reported from this laboratory contribute to the answer to this question (Cook and Spilles, 1931). Rats were fed varying proportions of copper and iron, and the effect of such diets on the splenic iron determined. When the food iron is deficient it would be expected that the reserve in the spleen would be drawn on extensively and therefore, after a few weeks, would be relatively low. Such is indeed the case. But when considerable copper is fed to the animals in conjunction with very little iron, the iron content of the spleen is much less than it is when copper is absent from the diet. Furthermore, when the copper is absent, the addition of large quantities of iron do not appreciably increase the splenic iron, but, on the other hand, when the dietary copper is high the addition of iron in the food is correlated with a large increase of iron in the spleen.

A possible interpretation of these results is as follows. Copper facilitates the transformation of splenic iron into a form which can be used in building new hemoglobin, thus making more available than otherwise the splenic iron reserve. This possibility is indicated by the greater withdrawal of the reserve when copper is high but iron is low in the diet. Under such adverse conditions the iron reserve is the sole remaining source of the metal for hemoglobin regeneration.

We know that copper, likewise, facilitates the utilization of food iron. Therefore as the food iron is increased from a low level in the presence of an adequate supply of copper, it comes to constitute the primary source for hemoglobin manufacture and the necessity for drawing on the splenic iron reserve disappears. But at the same time blood destruction is proceeding with a consequent continuous accumulation of iron in the spleen. Thus the needs of the animal are supplied from the food and the reserve is allowed to increase indefinitely.

Apropos of these considerations, it is worth while stressing two features of the situation, not because they are new but because they deserve emphasis beyond that which they have received in current discussion.

1. Copper (and probably other metals as well) facilitates the utilization of *both* dietary and stored iron, and it is possible that the same mechanism, as yet undiscovered, is operative in both cases.

2. Assuming adequate copper (or other metals) in the diet, there is a delicate balance between the two sources of iron supply, depending upon the quantity of iron present in each at a given time. This is in the sense that the food iron is the primary source and the reserve iron the secondary.

University of California.

S. F. COOK,
Berkeley.

---

* From the division of physiology, University of California Medical School, Berkeley, California.

* Abstract of remarks made at the 1932 annual session of the American College of Physicians.

Normal Variations of Erythrocyte Values in Women.—Smith and Prest studied two groups of subjects, the first having a normal and the second, a lower number of erythrocytes. The total number of cells, total hemoglobin content and total volume per cent were significantly higher in the normal than in the low groups, but the estimated mean corpuscular volume, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration remained constant. There were no significant diurnal variations in total number of cells, total hemoglobin content, total cell volume, estimated mean corpuscular hemoglobin concentration.—*American Journal of Physiology*, and *Journal of the American Medical Association*, Vol. 98, No. 17.